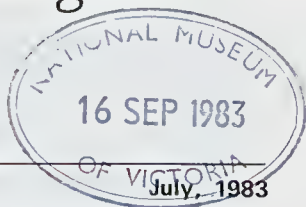


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MIGRATION RECORDS IN AUSTRALIA. 3. DANAINAE AND ACRAEINAE (LEPIDOPTERA: NYMPHALIDAE)

By C. N. Smithers

The Australian Museum, 6-8 College Street, Sydney, Australia, 2000

Abstract

Of the 16 species of Danainae and one species of Acraeinae occurring in Australia nine species are recorded as confirmed or suspected migrants. This note presents a summary of information on their movements.

Introduction

Eight of the 16 species of Danainae occurring in Australia and the single Australian Acraeinae have been observed to migrate or are suspected of doing so on indirect evidence. This is a higher proportion than is found in the Hesperidae (one species out of more than a hundred) or the Papilionidae (two migrant species in eighteen). This paper summarises information on the movements of Danainae and Acraeinae; parts 1 and 2 of this series of papers giving similar summaries for some orders other than Lepidoptera and for the Hesperidae and Papilionidae have already been published (Smithers 1970, 1978).

Danainae

Danaus affinis affinis (F.)

Williams (1930) mentions that this species has migratory habits and Moulds (1964) records two southern specimens at Broken Bay, New South Wales in March 1963. It has been sighted on four occasions moving east or north-east at Mount Tamborine, Queensland (obs. G. Sankowsky) and one specimen was taken at Careel Bay, N.S.W., an area in which it is not usually present, on 5.ii.1973 (obs. M. S. Moulds). Although details are few the above observations suggest at least occasional population movement.

Danaus chrysippus petilia (Stoll)

Williams (1930) mentions this species as a migrant and reported (Williams 1933) that a southerly movement took place in about 1915. Alexander (1917) reported a large flight in south-western Australia in the summer of 1914-15 and that the species visits the area each year. It is certainly a species given to making sudden appearances in areas from which it is usually absent and it seems to be very unevenly distributed through its range. Holloway (1962) reported its appearance in New Zealand and it was breeding there in April - May 1958 (Wise 1958). A strong easterly movement was reported 6th April 1973, at Kyneton, Victoria (Anonymous 1973). From these few published records, and the more recent observations given in Table 1, it is clear that mainly northerly movements can be expected in April.

TABLE 1
Summary of new migration records for *Danaus chrysippus petilia*

Locality	Date	Direction	Observer
Sawtell, N.S.W.	4-7.iv.1967	mainly N	P. Wilson
48km N of Singleton, N.S.W.	12.iv.1977	N 10/min/20m	C. N. Smithers
48km N of Singleton, N.S.W.	16-17.iv.1977	N 1/min/20m	C. N. Smithers
48km N of Singleton, N.S.W.	23-25.iv.1977	N 1/5 min/20m	C. N. Smithers
48km N of Singleton, N.S.W.	15.iii.1980	N 1-2/hr/20m	C. N. Smithers
48km N of Singleton, N.S.W.	22.iii.1980	NW 1/15 min/20m	C. N. Smithers
48km N of Singleton, N.S.W.	12.iv.1980	NW 3/5 min/20m	C. N. Smithers
48km N of Singleton, N.S.W.	21-22.iii.1981	N 3/min/20m	C. N. Smithers
48km N of Singleton, N.S.W.	28-29.iii.1981	N 10/min/20m	C. N. Smithers
48km N of Singleton, N.S.W.	5.iv.1981	N 2/min/20m	C. N. Smithers

Danaus hamatus hamatus (W. S. Macleay)

The literature from King (1826) to Straatman (1963) contains many references to appearance and "clustering" of this species at specific sites and there are several more recent records e.g. Townsville 1968-69 and Coen, Queensland, June 1971 (obs. G. B. Monteith); Cabbage Tree Island, New South Wales, December 1969 (obs. A. D'Ombrian); Mission Beach, Queensland, April 1971 (obs. M. S. Moulds); Magnetic Island, Queensland, April 1973 (A. Young). There are, however, no early records of directions of

flights. Wise (1965) mentions its appearance in New Zealand. Moulds (1963, 1964) and Peters (1963b) list specimens seen in and near Sydney (well to the south of its usual range); all sightings were in January, February or March. Straatman (1963) recorded a strong NNW migration between Tully and Ingham, Queensland, with numbers reaching a peak (55-65/min/80 m) in mid April.

Table 2 gives a summary of recent significant flight records.

The flights observed in December 1969 were in various directions suggesting somewhat local movements but from late February to May 1970 the flights indicate predominantly southerly movements over a wide area. Records for December 1970 and early January 1971 again suggest haphazard movement but from about mid January there is again an indication of southerly movement which penetrated further south than Sydney and was still evident as a movement even from the small numbers reaching Sydney. The onset of the southerly movement was apparently a little earlier in 1971 than in 1970. Although less detailed than that for later years the data provided by Moulds (1963, 1964) and Peters (1963b) suggest that similar unusually strong, southerly extensions took place in 1962 and 1963, perhaps on a smaller scale.

In general terms it seems that early local flights of various directions in the northern areas become predominantly southerly as the season progresses but the time at which this happens varies from year to year i.e. anything from January (as recorded by Moulds *loc. cit*) to as late as February (e.g. as in 1970).

Danaus plexippus (L.)

The regular, large-scale flights of this species in North America are amongst the frequently cited classic cases of insect migration. Such spectacular movements have not been seen in Australia but widespread, regular, population movements of a less conspicuous nature do occur. These have already been described and discussed (Smithers 1977) and details need not be repeated here. The annual cycle includes winter periods when part of the population is in reproductive "diapause" and during which clustering takes place at certain sites.

Euploea core corinna (W. S. Macleay)

There are very few published records of obvious population movements in this species but several authors have reported its concentration over small areas (e.g. Poulton 1922); this suggests movement into and away from certain sites. It has also been recorded in numbers well beyond its usual breeding range in some years. In 1948 there was a spread, with specimens reaching Victoria (Anonymous 1948; Plant 1948; Chadwick 1951, 1954). For April and May 1955 Straatman (1963) recorded a flight between Tully

TABLE 2
Summary of new migration records for *Danaus hamatus hamatus*

Locality	Date	Direction	Observer
Wallville, Q.	xii.1969	N	G. Sankowsky
Gladstone to Rockhampton, Q.	xii.1969	E	G. Sankowsky
N of Rockhampton to Sarina, Q.	xii.1969	W	G. Sankowsky
Brisbane, Q.	xii.1969	W	G. Sankowsky
Mackay, Q.	28.ii-3.iii.1970	SE 29/5 min/30m	A. Bird
Mackay, Q.	7.iii.1970	SW	A. Bird
Sawtell, N.S.W.	17.iv.1970	large numbers	P. J. Wilson
Eurimbulah, N of Bundaberg, Q.	v.1970	SE	G. Sankowsky
Cairns, Q.	v.1970	S large numbers	G. Sankowsky
16km offshore in Whitsunday Passage, Q.	vi.1970	on ship	A. Bird
Brisbane, Q.	14.xii.1970	S 96/hr	P. Bensley
Inverell, N.S.W.	1.i.1971	W	M. S. Moulds
Brisbane, Q. to Yerongpilly, N.S.W.	9-20.i.1971	SE	A. Bird
Urunga, N.S.W.	20-27.i.1971	SSW several dozen/day	M. S. Moulds
Willoughby, N.S.W.	26-28.i.1971	S several sightings	P. Wilson
Maitland, N.S.W.	1.ii.1971	large numbers	A. D'Ombrian
Conobolas, N.S.W.	ii.1971	large numbers	J. Hicks
Sydney (several localities)	1-2.ii.1971	S large numbers	L. C. Haines, J. V. Peters, C. Trickett, G. A. Holloway & C. N. Smithers
Gloucester, N.S.W.	6.ii.1971	SE	A. B. Rose
Booral, N.S.W.	7.ii.1971	SW, W	A. B. Rose
Camden, N.S.W.	8.ii.1971	several	C. Trickett
Sydney (several localities)	13-15.ii.1971	S, SSE	J. V. Peters, A. B. Rose, C. N. Smithers
Sydney (several localities)	20-21.ii.1971	S, SSE	M. Lovell, J. V. Peters, A. B. Rose
Sydney (Turramurra)	28.ii.1971	1 specimen	C. N. Smithers
Mackay, Q.	viii.1971	SE	A. Bird
Conway National Park, N.S.W.	23.iii.1972	ENE 1/min/40m	P. Wilson
Ravenshoe, Q.	vi.1973	E	M. Lockyer
Yeppoon, Q.	14.ii.1974	NNE 6/min	A. Atkins

and Ingham, Queensland. Moulds (1963) records a few specimens from in or near Sydney, New South Wales, in January 1962. Records from 28th October to 6th June 1963 (Moulds 1964, Chadwick 1974a) indicate a major invasion to the south with breeding through at least one generation well south of its usual breeding areas. Fletcher (1973) records an invasion of Heron Island, Queensland, and a south-easterly flight in January 1971. The latter coincided with sightings at Maitland, New South Wales (obs. A. D'Ombrain). From December 1973 to April 1974 there are records for Sydney (Nikitin 1974), Wollongong (Chadwick 1974b) and several inland areas of New South Wales (Anonymous 1974a) which suggest another southerly invasion. One Sydney record is as late as June 1974 (Anonymous 1974b). Sightings in Victoria were reported from several localities between January and April 1974 (Quick 1974). Table 3 includes records of sightings in the Sydney area during October and November 1973 and in May 1977.

TABLE 3
Summary of additional sightings of *E. core corinna* which suggest migration

Locality	Date	Direction	Observer
Lorn (Maitland), N.S.W.	14.ii.1971	specimens seen	A. D'Ombrain
Magnetic Island, Q.	iv.1973	concentration	A. Young
Sydney, N.S.W.	21.x.1973	specimen taken	H. G. Smithers
Sydney, N.S.W.	21.x.1973	specimen seen	D. K. McAlpine
Sydney, N.S.W.	1.xi.1973	specimen seen	C. N. Smithers
Sydney, N.S. W.	xi.1973	many sightings	A. B. Rose
Sydney (Avalon Beach), N.S.W.	25.i.1974	2 specimens taken	M. S. Moulds
Sydney, N.S.W.	6.v.1977	specimen seen	G. Daniels
Sydney, N.S.W.	iii-iv.1981	several seen	R. Brewer

Clearly, *E. core corinna* is a species in which movements take place within the usual breeding range with fairly frequent extensions of the range southwards, probably most noticeable when populations are high. Moulds (pers. comm.) reports that continuous breeding takes place at Umina and Avoca Beach (near Gosford), with larvae present in large numbers in March.

Euploea sylvester sylvester (F.)

Clusters of this species have been reported from Townsville and Coen, Queensland, in June 1971 (obs. G. B. Monteith) and from near Darwin, Northern Territory, in August 1970 (obs. J. V. Peters) while clusters of several thousands were seen in rainforest along Peach Creek, 25 km NNE of Coen between 2nd and 4th November 1979 (obs. M. S. Moulds). The clustering habit suggests population movement as this is part of the behaviour cycle of several migrant species. Obvious unidirectional flights have, however, not yet been reported.

Euploea eichorni Staud.

Straatman (1963) records a NNW migration from mid February to mid April 1962 between Tully and Ingham, Queensland, and clustering at Forest Beach, Queensland, in late June 1961. These observations suggest behaviour similar to that of *E. sylvester*.

Euploea tulliolus tulliolus (F.)

Evidence of migration in this species comes from three observed flights, one N at Mackay, Queensland, in May 1969, with a density of 3.4/10 /mins (obs. A. Bird), one N, 140 km N of Bundaburg, Queensland, in May 1970 in which very large numbers were seen (obs. G. Sankowsky) and one S at North Beach, near Urunga, 23rd January 1971 (obs. M. S. Moulds).

Acraeinae

Acraea andromacha (F.)

Williams (1930) records a flight of this species through Cairns, Queensland, in May and June 1928 and this appears to be the only record of a population movement sighting. Moulds (1963, 1964) and Peters (1963a, 1963b) record specimens from in and near Sydney, New South Wales, during the summers of 1962 and 1963. An additional record is a sighting at Bulli, New South Wales, on 13th April 1970 (obs. J. V. Peters). The sporadic southerly sightings are probably due to invasion during a temporary southerly extension of range, as in *E. core*.

Comments

Observations so far made indicate that the migratory habit is more frequent in the nymphalid subfamily Danainae than in the Hesperiidae or Papilionidae. In Australia the Danainae are predominantly species of the "Torresian" zoogeographic province and, as such, have their main centres of distribution and breeding in the northern and north-eastern parts of the continent. Variations in climate probably provide opportunity for them to extend their range southwards from time to time and some of them, e.g. *E. core*, can breed through one or two generations in the area of southerly extension. Clearly, however, permanent establishment is difficult. It is interesting to note that the widespread *Danaus plexippus* exhibits differences in behaviour and seasonal cycles in the northern "Torresian" province from those which it exhibits in the more southerly "Bassian" zoogeographic province (Smithers 1977).

To date there has been little detailed work on Danaine population movements within the main areas of their distribution and breeding; comparative studies on the species of *Euploea* and *Danaus* would probably yield interesting data as they undoubtedly have regular, if limited, population movements.

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